THE IMPACT OF INTELLECTUAL CAPITAL STRATEGY ON FIRM VALUE AND FINANCIAL DISTRESS

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Abstract

This study aims to examine the effect of intangible assets, on corporate financial performance and financial distress. Intangible assets in this study are explained by human capital efficiency (HCE), relational capital efficiency (RCE), structural capital efficiency (SCE), and capital employed efficiency (CEE). The measurement model often used is the extended value-added intellectual coefficient plus (EVAIC+) model by Ulum (2017), which is a model developed from a comparison of Edvinsson's (1997) and Pulic's (2000) models. Financial performance is measured by firm value with price to book value (PBV) proxy, and financial distress with Altman Z-score. This study was conducted using secondary data and sample selection using purposive sampling with samples being listed manufacturing companies in Indonesia, Singapore, Malaysia, Thailand, the Philippines and South Korea, Japan, and China Stock Exchanges for the period 2011–2021. The results of the study on Model 1 found that HCE, RCE, and CEE have a positive effect and significance and SCE have a negative effect and significance on firm value. Model 2 found that HCE, RCE, and CEE have a positive effect and SCE have a negative effect and significant on financial distress. The results of this study can be used as a reference for companies to be able to manage intangible assets, especially intellectual capital disclosure.

Keywords: Corporate Finance, Financial Distress, Manufacturing

Authors' individual contribution: Conceptualization — M.J.; Methodology — M.J.; Software — M.J. and E.H.; Validation — R.S., E.H., and G.S.S.U.; Formal Analysis — M.J., R.S., and E.H.; Investigation — M.J.; Resources — M.J.; Data Curation — M.J.; Writing — M.J.; Visualization — R.S.; Supervision — R.S., E.H., and G.S.S.U.; Project Administration — G.S.S.U.; Funding Acquisition — G.S.S.U.

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1. INTRODUCTION

Intellectual capital was first known from Stewart's (1991) article wherein the theory is published in business journals and national media through popular press articles. This provides a separate challenge from the academic side to develop the phenomenon by using existing theory with a better conceptualization of an intangible asset that was difficult to understand in its era. The topic of intellectual capital is important because it is rarely studied or understood. In fact, managers and investors often ignore the input and output of a person's intellectual property in their business

operational performance (Stewart, 1991), suggesting that a company's intellectual capital is usually three or four times greater than the book value of tangible assets. Stewart stated that executives don't throw cash or factories idle without reciprocity, but when chief executive officers (CEOs) are asked how much of their company's knowledge is used, they usually say only about 20%. After the publication of this essay, research on intellectual capital started to be done, with the goal of defining it precisely and identifying the metrics that should be used to measure it, for example, research conducted by Pulic (2000), research conducted by Edvinsson (1997), Skandia Navigator (Kaplan & Norton, 1992), Balance Scorecard (Roos et al., 1997), Intellectual Capital Index (ICI) (Stewart, 1991). Sveiby (1997) concluded that intellectual capital positively influences firm value and increases financial performance.

The intellectual capital model developed by Pulic (2000) focuses on the meaning of knowledge and how this knowledge can create value for the company. Pulic developed the concept of knowledge from a writer named Sveiby (1997): knowledge is the ability to act and the ability to act is knowledge — all doing is knowing and all knowing is doing. The conclusion that knowledge is an action that achieves a goal is a fundamental characteristic of the idea of knowledge. For companies, the goal to be achieved through these actions is "value creation" because only organizations that create value are able to survive in a going concern. If in a company, there are workers who have high knowledge, can it guarantee that these employees work productively? In solving this problem, it is necessary to identify a measurement that measures "intellectual capital efficiency". The indicator used is the value-added on labor costs which is usually used to measure the productivity of each type of work. Value-added on labour costs is an indicator of organizational knowledge that can provide an overview of human resource knowledge in terms of value creation. For this reason, human capital refers to all the qualities of employees' talents and competencies and structural capital refers to all the qualities of intangible assets (such as brands, patents, processes, and organizational structures).

The importance of intangible assets in increasing firm value and influencing company financial policies on capital structure. For example, Apple and Pfizer patents, Coke and Walmart's supply chain, and highly efficient business processes have indirectly strengthened the company's competitive advantage and value. Recording the effect of intangible assets on company accounting policies is still tricky because accounting is conservative-based and recognizes only some of the intangible assets generated internally on the balance sheet. For example, expenses for advertising as research and development (R&D) expenses are still recorded in advertising costs for the company's operations. Conversely, accounting capitalizes intangible assets acquired externally.

Resource companies are not only concerned with how many products are produced, but to compete and grow, companies invest a lot in intangible assets, including intellectual capital. As a capital-intensive and knowledge-intensive industry, the manufacturing industry is the backbone of a country's economy. The manufacturing industry still plays an essential role in a country's gross domestic product (GDP) income towards national economic growth. The manufacturing industry has a significant component of state revenue through tax payments. In terms of the investment sector, the manufacturing industry is still a sector that has realized more significant investment than others, which positively impacts employment. The manufacturing industry is always expected to have good performance. In order to achieve this target, the manufacturing industry continues to conduct R&D on production equipment or the goods and services they produce. This sector is also one of the targets of a country's economic recovery program after being hit by COVID-19. Moreover, the manufacturing sector has attracted much attention in the intellectual capital literature (Pulic, 2000; Maji & Goswami, 2017; Mohammad et al., 2018; Nadeem, Gan, & Nguyen, 2018; Bayraktaroglu et al., 2019; Wang et al., 2018; Chowdhury et al., 2019; Kweh et al., 2019).

The reason that underlies the researchers chose the sample is that seen from the contribution of the manufacturing sector to GDP in Association of Southeast Asian Nations (ASEAN) countries (Indonesia, Malaysia, Thailand, the Philippines, and Singapore) are more leading than other ASEAN countries. The ASEAN-five and the top three in Asia by China, South Korea, and Japan. This paper aims to modify and expand the original value-added intellectual coefficient (VAIC) model using the latest measurement, the extended VAIC (EVAIC) model and the influence of intellectual capital and its components on manufacturing company performance and financial distress. Measuring company performance using price to book value (PBV) and financial distress using Altman Z-score.

The first contribution of this research is intellectual capital research by utilizing an EVAIC+ model to more precisely measure intellectual capital. The second contribution is this paper also includes macroeconomic metrics and country-level factors to reduce external influences. Third, this research can clarify the relationship between corporate performance and intellectual capital in developing and developed Asian economies. These results can serve as a starting point for policymakers and enterprise managers to better comprehend the significance of intellectual capital components and their impact on company performance and to build more effective strategies to effectively manage intellectual capital resources in order to obtain a competitive edge. The researchers also assert that the VAIC approach can forecast future financial results.

The structure of this paper is as follows. Section 2 reviews the literature concerning intellectual capital, financial distress, and firm value. Section 3 describes the research methodology that has been used. Section 4 presents the results and analysis. Section 5 provides the discussion and Section 6 outlines the conclusions and suggestions.

2. LITERATURE REVIEW

2.1. Resource-based theory

The resource-based view theory model looks at the effects of the two hypotheses when examining sources of long-term competitive advantage. As

a result, the heterogeneity between enterprises is determined by resource heterogeneity (Rothaermel, 2018).

Three broad categories can be used to classify corporate resources (Barney, 1991): first, material resources, which are connected to a company's technology, plant and equipment, location, and access to raw materials; second, human resources, which are connected to a company's managers and employees' education, experience, judgment, intelligence, relationships, and insights; and third, is organizational resources, which are connected to a company's formal reporting structure, formal and informal planning, and conflicts.

According to Ni et al. (2021), intellectual capital is a significant knowledge resource since it is something useful, uncommon, special, and difficult to copy. It can also be transferred to others, and its components can be defined and studied. Intellectual capital can be turned into a competitive advantage for a business by having the aforementioned qualities. Intangible assets are crucial for decision-makers because they are typically difficult to see, feel, or describe. Realizing the business performance of the corporation is another excellent technique to maximize the value of intellectual resources. Intellectual capital is a tangible outcome of utilised management strategies, processes, and tools, and company resources and capabilities must be leveraged efficiently to attain better competitive potential (Radjenovic & Krstic, 2017).

2.2. Intellectual capital, financial performance and financial distress

The disclosure of a company's sustainability is mostly focused on its operations, including how economic, environmental, and social repercussions are applied and how the companies deal with them. The application and practice of corporate governance direct the management of corporate resources, which is crucial for social consequences because it includes employees as human resources. The definition of corporate governance is the process by which management upholds the rights and interests of the company's stakeholders and establishes mechanisms to guarantee their accountability and responsible behaviour (Santoso et al., 2023). Financial performance is a benchmark for users of financial reports, internal and external to the company, which is used as the basis for decision-making. Internal parties are expected to be able to produce financial performance according to the target to attract external parties to invest. The methods used when analyzing financial statements include comparison methods, percentage trends and calculation of financial ratios. The results of proper financial statement analysis measure and evaluate the achievement of goals and objectives, for example, obtaining an adequate return on investment or maintaining a satisfactory financial position. There are two considerations in the analysis of financial statements. First, the company's ability to survive is seen through the liquidity and solvency ratio. Second, financial performance is measured by profitability. According to Alexandre et al. (2020), regarding research that has been made previously, there are several causes of financial distress factors faced by companies, including:

1) the liabilities owned by the company exceed the total assets owned, so they cannot cover the obligations that must be paid;

2) the profit earned from a company is not possible to cover the company's obligations incurred, thus impacting cash flow difficulties;

3) losses experienced by the company for its business activities in the long term have a negative cash flow impact.

Investors, creditors, and management are increasingly concerned about financial trouble forecasts and bankruptcy. When a company's cash flow is insufficient to cover its present financial liabilities, it is referred to as being in financial distress. Determining whether a company is experiencing financial difficulties is important because it enables managers to provide appropriate management to keep the business operating. It also aids creditors and investors in assessing the risks they face in a situation where a company experiences financial difficulties. However, many financially troubled businesses have never declared bankruptcy as a result of mergers or privatizations, while well-established businesses frequently do so to escape paying taxes and paying for expensive legal defences (Ha et al., 2023).

Financial distress can arise because the company cannot fulfil its obligations as a lessee to make debt loan payments. This is because companies cannot maintain and manage the balance of corporate finance. If financial difficulties decrease, the company will not experience difficulties in paying off its obligations. If financial distress increases, productivity will be affected because employees fear losing their job status. As a result, if the company experiences financial distress, it will influence investors to withdraw their investment. The company will experience low capital ownership and eventually experience bankruptcy (Kamaluddin et al., 2019).

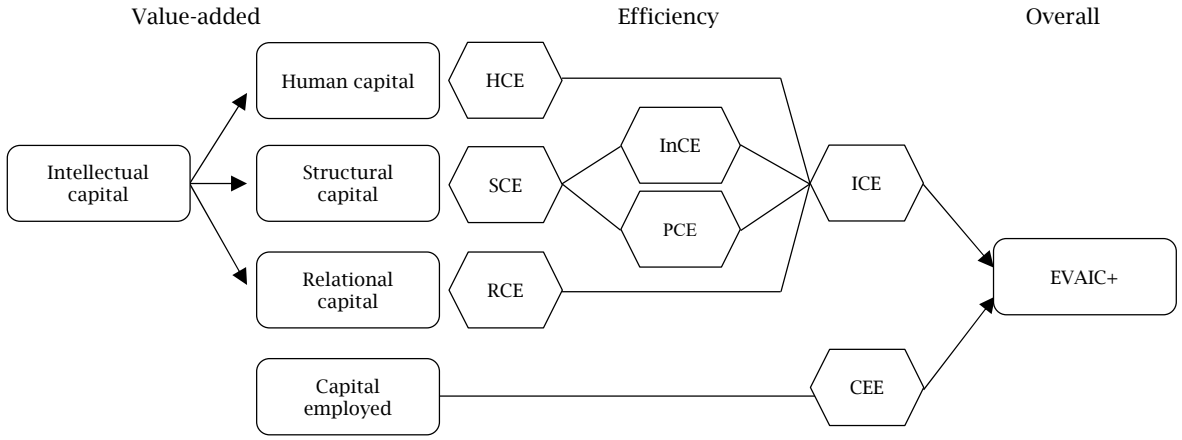
2.3. EVAIC+ model

Research on intellectual capital has produced two measurement models: 1) non-monetary and 2) monetary. Monetary measurement models try to estimate the value of intellectual capital using financial ratios. The measurement model often used is the VAIC model, which was formulated by Pulic (2000). Pulic claims the method he developed focuses on value creation and must be able to monitor the efficiency of resources to create that value. Compared to other methods, the advantage of this method is that the data used to measure the variables in the public model are easy to obtain from various types of companies. The data is data from figures that are commonly used in financial reports.

Knowledge held by businesses is frequently utilized as a source of competitive advantage, and intellectual capital for businesses is "knowledge that can be converted into value". The corporation generates new value for itself by developing innovations that can be sold and generated by the company's human capital, translated into intellectual assets, and legally protected. When a company has too many inventions, management must devise strategies to filter out the less desirable innovations and discover the innovations that will generate the most value. Companies with insufficient

innovation must build strategies to stimulate innovation, particularly in key technology or innovative sectors. Companies that successfully manage their intellectual capital achieve a number of things. Companies can create rules, procedures, and internal decision-making processes to produce and maintain customer-acceptable commercialized ideas. Thus, intellectual capital can indirectly create new value creation, particularly good innovation for the company and its customers. Applying intellectual capital is worthwhile, but will give significant benefits if applied by the organization.

Figure 1. EVAIC+ formulation



Note: HCE — human capital efficiency, SCE — structural capital efficiency, RCE — relational capital efficiency, PCE — process capital efficiency, CEE — capital employed efficiency, ICE — intellectual capital efficiency, InCe — innovation capital efficiency.

Human capital is an employee in a company whose abilities must be developed, such as knowledge, experience, commitment and motivation (Bontis, 1998). Human capital has the greatest effect on the company because every employee from the bottom-top level must possess the learning process, system configuration, and analytical management skills and indirectly represent efficiency in the use of the company's resources. This id provides a positive relationship between intellectual capital and the company's financial performance. Human capital resources can be interpreted as the collective ability of employees to solve every customer problem. The company's human capital is institutional knowledge and memory about important matters, which includes collective experience, skills, and general knowledge that all employees have. So, human capital resources can generate value creation for companies, but companies will need help to provide value to their employees. Companies must be able to have information related to the strength of the company's human resources, such as knowing what information or knowledge is relevant, which employees have the best knowledge skills, and the speed with which knowledge is shared. Small companies find it easier to know what knowledge is relevant to the situation and how to access the knowledge possessed by human resources. As companies grow and the size of human capital increases, such knowledge is less widely shared and more compartmentalized.

Innovation capital can encourage companies always to innovate their products and services to increase company value growth (Tseng et al., 2015). Innovation focus can encourage companies to explore new areas and pursue long-term competitive advantage and growth. Innovation capital efficiency directly impacts company productivity and has a moderating effect on profitability, which means that an increase in R&D costs will lead to an increase in profitability (Bayraktaroglu et al., 2019). Thus, companies with good knowledge management will increase their chances of being innovative and have better performance to increase their profitability and firm value. Scafarto et al. (2016) argue that process capital efficiency includes procedures, systems and techniques an organization adopts to achieve process quality and operational efficiency. Companies developing Big Data analytics (BDA) will improve their performance, and knowledge management orientation certainly plays an important role in strengthening the effect of BDA capabilities.

Structure capital is the infrastructure owned by the company to connect human resource capital. Includes direct and indirect support for each physical and intangible. Direct support, namely support that can be held, felt, and physically seen by human resource capital directly, such as computers, desks and telephones, and intangible support, such as information systems, computer software, work procedures, marketing plans, and company knowledge. Indirect support includes physical elements such as buildings, lights, electricity, and plumbing and indirect elements such as strategic plans, payroll systems, cost structures, and supplier relationships. Structure capital provides an environment that encourages human resources to create and utilize their knowledge.

A performance management system is created by keeping the planning and action plan phases of the performance management process consistent. The system is made to make sure that comprehensive performance management is simple to implement. Systems for performance management will be made available, acting as a strategic link between different systems and the demands and goals of different interest groups. Three advantages of a performance management system are as follows: 1) fixing unimportant performance; 2) consistently producing quality performance; and 3) enhancing performance (Noordiatmoko et al., 2023).

Relational capital efficiency explains the ability to market products and services, how to be loyal to customers and analyze market segmentation of the products and services offered. Roos et al. (1997) argue that relational capital efficiency includes available knowledge in formal and informal relationships, social networks, trust, organizational reputation, customer requirements, customer loyalty and interactions with competitors and suppliers.

Capital employed efficiency explains how each component of intellectual capital is related to one another. Manzaneque et al. (2017) revealed that recruiting human capital who is competent in their field covering the knowledge, expertise and skills of employees is very important to achieve an innovative product that can provide a competitive advantage for companies. This ix will lead to customer satisfaction and improve customer relationships. In short, intellectual capital is a component that cannot be measured using the company's balance sheet because knowledge, loyalty, and innovation cannot be measured with numbers but from the process of transforming knowledge and becoming intellectual property (Edvinsson, 1997). The hypotheses formulated based on the description above are:

H1: Human capital efficiency has a positive effect on financial performance.

H2: Relational capital efficiency has a positive effect on financial performance.

H3: Structural capital efficiency has a positive effect on financial performance.

H4: Capital employed efficiency has a positive effect on financial performance.

H5: Human capital efficiency has a positive effect on financial distress.

H6: Relational capital efficiency has a positive effect on financial distress.

H7: Structural capital efficiency has a positive effect on financial distress.

H8: Capital employed efficiency has a positive effect on financial distress.

3. RESEARCH METHODOLOGY

3.1. Sample selection

The population of this study is manufacturing sector companies listed in Indonesia, Singapore, Malaysia, Thailand, the Philippines (ASEAN-5) and Korea, Japan, and China Stock Exchanges in the 2011–2021 period. Research observations, using the object of the annual financial reports of all manufacturing companies listed on the Stock Exchange in each country and using data available at S&P Capital that meet the sampling criteria. The sample tested for 11 years and the total sample size is 39,006. This observation data was then tested using panel data.

3.2. Variable measurement

3.2.1. Dependent variable

The basic formula for EVAIC+ can be written as follows:

$$EVAIC+= ICE + CEE \quad (1)$$

$$ICE = HCE + SCE + RCE \quad (2)$$

$$SCE = InCE + PCE \quad (3)$$

where,

- *ICE* — intellectual capital efficiency;
- *CEE* — capital employed efficiency;
- *HCE* — human capital efficiency;
- *SCE* — structural capital efficiency;
- *RCE* — relational capital efficiency;
- *lnCE* — innovation capital efficiency;
- *PCE* — process capital efficiency.

Before determining the formulation of each of these components, we need to know in advance what the basic formulation of value-added (*VA*) is. This model offers three *VA* calculation models, namely:

$$VA = W + I + DD + T + R \quad (4)$$

This first formulation is based on the model developed by Pulic (2000), which states that *VA* is the sum of salaries (*W*), interest (*I*), dividends (*DD*), taxes (*T*) and changes in retained earnings (*R*).

$$VA = OP + EC + D + A \quad (5)$$

The second formulation is based on the model developed by Pulic (2000), where *VA* is the total value of operating profit (*OP*), employee cost (*EC*), depreciation (*D*), and amortization (*A*).

$$VA = OUT - IN \quad (6)$$

where, *OUT* — sales expenses and other costs excluding employee expenses, *IN* — total income.

The third formulation follows the initial formula from Pulic (2000), where *VA* is the difference between total sales revenue and expenses and other costs excluding employee expenses. After knowing the basic formula for calculating *VA*, you can calculate the formula for each component of EVAIC+ as follows:

$$HCE = \frac{HC}{VA} \quad (7)$$

where, *HC* — total expenses for employees. This ratio shows how much investment the company has contributed to its employees to the value-added of the organization.

$$InCE = \frac{InC}{VA} \quad (8)$$

where, *InC* — R&D costs.

This ratio shows how much investment the company has contributed to R&D towards the *VA* of the organization.

$$PCE = \frac{PC}{VA} \quad (9)$$

where, *PC* — depreciation and amortization expenses.

This ratio shows how much the contribution of the assets that have been used to the organization's added value.

$$RCE = \frac{RC}{VA} \quad (10)$$

where, *RC* — marketing costs.

This ratio shows how much the investment contribution that the company has made to establish relationships with consumers on the value-added of the organization.

$$CEE = \frac{CE}{VA} \quad (11)$$

where, *CE* — book value of total assets.

This ratio shows how much the contribution of capital is employed to the value-added of the organization.

3.2.2. Independent variable and control variable

Table 1 presents a list of variables used in the study and their definitions.

Table 1. Variable definitions

Variables	***Codes***	***Definitions***
Price to book value	*PBV*	Market price per share over book value per share
Altman Z-score	*Altmans*	Altman Z-Score = 1.21 * *X1* + 1.4 * *X2* + 3.3 * *X3* + 0.6 * *X4* + 0.99 * *X5,* where *X1* = Working capital / Total assets, *X2* = Retained earnings / Total assets, *X3* = Profit before Interest and tax / Total assets, *X4* = Market value of equity / Book value of total debt, *X5* = Sales / Total assets
Human capital efficiency	*HCE*	Human capital over value-added
Structural capital efficiency	*SCE*	Innovation capital efficiency plus process capital efficiency
Relational capital efficiency	*RCE*	Relational capital over value-added
Capital employed efficiency	*CEE*	Capital employee over value-added
Firm size	*SIZE*	Ln (total asset)
Current ratio	*CR*	Current assets over current liabilities
Debt to equity ratio	*DER*	Total debt over total equity
Inflation rate	*INF*	Average inflation per year
Gross domestic product	*GDP*	Average GDP per year
COVID-19 years	*COVIDYears*	Using dummy variable (1 for 2020 and 2021 years with COVID-19 and 0 for years without COVID-19)
Founding years	*FoundingYears*	The length of time a company has been established is calculated from the time the company was founded until the year of research

3.3. Models

Panel data regression analysis was used in this study using STATA v17. The Chow and Hausmant tests need to be performed first. The Chow test was conducted to determine whether the common or fixed models would be used in this study, while the Hausmant test was used to determine whether the fixed model or random effect. Hypothesis testing uses two linear analysis models intending to see whether there is influence from the *intellectual capital* component (the dependent variable) on *firm value* and *financial distress* as assessed by two independent variable indicators, two research models are obtained as follows:

Model 1:

$$PBV_{i,t,c} = \beta_0 + \beta_1 HCE_{i,t,c} + \beta_2 SCE_{i,t,c} + \beta_3 RCE_{i,t,c} + \beta_4 CEE_{i,t,c} + \beta_5 SIZE_{i,t,c} + \beta_6 GDP_{i,t,c} + \beta_7 INF_{i,t,c} + \beta_8 CR_{i,t,c} + \beta_9 DER_{i,t,c} + \beta_{10} FoundingYears_{i,t,c} + \beta_{11} COVIDYears_{i,t,c} + \varepsilon_2 \quad (11)$$

Model 2:

$$FD_{i,t,c} = \beta_0 + \beta_1 HCE_{i,t,c} + \beta_2 SCE_{i,t,c} + \beta_3 RCE_{i,t,c} + \beta_4 CEE_{i,t,c} + \beta_5 SIZE_{i,t,c} + \beta_6 GDP_{i,t,c} + \beta_7 INF_{i,t,c} + \beta_8 CR_{i,t,c} + \beta_9 DER_{i,t,c} + \beta_{10} FoundingYears_{i,t,c} + \beta_{11} COVIDYears_{i,t,c} + \varepsilon_2 \quad (12)$$

Moreover, it can be tested by analyzing the multicollinearity test seen from the value of tolerance and variance inflation factor (VIF). Heteroscedasticity test through the Modified Wald test and the autocorrelation through the Wooldridge test, as well as hypothesis testing such as the test the coefficient of determination, which sees the greater the value in R^2, the independent variable can explain the dependent variable, statistical F-test seen from the value significance of 0.05, does the independent variable have an effect simultaneously and the t-test seen from the significance of 0.05 whether the independent variables individually affect variable dependent.

4. RESULTS

4.1. Descriptive statistic

Based on Table 1 report *PBV* variable in the table above has a mean of 1.6881. The standard deviation of *PBV* is 1.5902, the lowest value of 0.26 and the *financial distress* variable in the table above has a mean of 3.3748. The standard deviation of *Altmans* is 2.5047 and has the lowest value of -0.12, which is less than the mean. The independent variable human capital efficiency (*HCE*) variable in the table above has a mean of 0.0373. That means increased revenue per employee suggests that people contribute more to the organization and raise corporate value, which may explain why human capital is so vital to the firm. The structural capital efficiency (*SCE*) variable in the table above has a mean of 0.5313. In terms of innovation capital, the range between maximum and lowest values of intangible assets with goodwill included is quite wide, even reaching nothing at the low end. This also happened with the R&D spending ratio. The relational capital efficiency (*RCE*) variable in the table above has a mean of 0.4632. Furthermore, in terms of customer capital, the discrepancy between the highest and minimum revenue growth rate is rather large, with some organizations even

having a negative rate. Because consumers are the driving force for enterprises to create money, it is expected that these organizations will develop diverse client relationships as a result of their disparate operating and marketing strategies. The capital employed efficiency (*CEE*) variable in the table above has a mean of -0.006.

Table 1. Descriptive statistics of the EVAIC model

Variables	*Obs*	*Mean*	*Std. dev.*	*Min*	*Max*
PBV	39,006	1.688132	1.590236	0.26	7.87
Altmans	39,006	3.374882	2.504727	-0.12	13.22
HCE	39,006	0.0373	0.749558	-0.92	1.51
SCE	39,006	0.531328	0.891501	-1.49	2.53
RCE	39,006	0.463294	0.946062	-1.92	3.48
CEE	39,006	-0.0063	0.083967	-8.28	0.45
SIZE	39,006	9.747347	2.712465	3.93	16.94
CR	39,006	2.207436	1.326186	0.57	6.89
DER	39,006	0.41255	0.431166	-1.2	1.92
INF	39,006	1.238808	1.542973	-0.9	8.38
GDP	39,006	2.415257	2.670236	-9.5	7.6
FA	39,006	41.53974	32.81867	1	421
COVIDYears	39,006	0.181818	0.3857	0	1

4.2. Panel data models

The results of the Chow test on Models 1 and 2 show the results of Prob > F = 0.0000, which means it is significant at 1% alpha. From these data, it can be concluded that H_0 is rejected, or the fixed effect model is better than the common effect. The results of the Hausman test on Models 1 and 2 show the results of Prob > chi^2 = 0.0000. The results of the Hausman test that has been carried out obtained significant results so that it can be concluded that *H1* is accepted and H_0 is rejected, or the fixed effect model (FEM) is better than the random effect model (REM).

The following is the result of R^2 Model 1 is 0.0914 and Model 2 is 0.326. The F-test Model 1 with a value of F (11.35448) = 59.62, has the result Prob > F = 0.0000 and F-test Model 2 with a value of F (11.35448) = 1602.15 has the result Prob > F = 0.0000. It can be concluded that the independent variables, which are *HCE*, *SCE*, *RCE*, and *CEE*, significantly and simultaneously influence the dependent variable in the research.

Table 2. Regression results of EVAIC model

Variables	*Model 1 Firm value*			*Model 2 Financial distress*		
	Coefficient	*t*	*P > t*	*Coefficient*	*t*	*P > t*
HCE	0.1623212	15.64	0.000***	0.2376662	18.38	0.000***
SCE	-0.079525	-7.57	0.000***	-0.0910365	-6.96	0.000***
RCE	0.0404877	3.76	0.000***	0.0731951	5.45	0.000***
CEE	0.3624648	4.70	0.000***	0.4553582	4.74	0.000***
SIZE	-0.1114267	-7.83	0.000***	-0.3822129	-21.55	0.000***
CR	0.0049459	0.70	0.485	1.064.312	120.64	0.000***
DER	0.0622144	3.50	0.000***	-0.1236918	-5.58	0.000***
INF	-0.1044296	-27.24	0.000***	0.0017747	0.37	0.710
GDP	0.0296032	11.87	0.000***	0.0147062	4.73	0.000***
FA	-0.0033904	-6.28	0.000***	-0.0013479	-2.01	0.045**
COVIDYears	-0.1767565	-13.36	0.000***	-0.2784856	-16.90	0.000***

*Note: * p < 0.10, ** p < 0.05, *** p < 0.01, t-values are in parentheses.*

Table 2 shows that intellectual capitals such as *HCE*, *RCE*, and *CEE* have a positive significant relationship with firm value and financial distress and only *SCE* have a negative significant relationship with *firm value* and *financial distress*.

The result Table 2 is:

1. *HCE* has a coefficient of 0.1623 with a probability of 0.0000 and has a positive and significant influence on *firm value* with a value of P > |t| = 0.000 or significant at 1% alpha. *H1* accepted.

2. *SCE* variable has a coefficient of -0.0795 with a probability of 0.0000 and has a negative and significant influence on *firm value* with a value of P > |t| = 0.000 or significant at 1% alpha. *H2* accepted.

3. *RCE* has a coefficient of 0.0404 with a probability of 0.0000 and has a positive and significant influence on *firm value* with a value of P > |t| = 0.000 or significant at 1% alpha. *H3* accepted.

4. *CEE* has a coefficient of 0.3624 with a probability of 0.0000 and has a positive and significant influence with a value of P > |t| = 0.000 or significant at 1% alpha. *H4* accepted.

5. *HCE* has a coefficient of 0.2376 with a probability of 0.0000 and has a positive and significant influence on *financial distress* with a value of P < |t| = 0.000 or significant at 1% alpha. *H5* accepted.

6. *SCE* has a coefficient of -0.0910 with a probability of 0.000 and has a negative and significant influence on *financial distress* with a value of P < |t| = 0.000 or significant at 1% alpha. *H6* accepted.

7. *RCE* has a coefficient of 0.0731 with a probability of 0.000 and has a positive and significant influence on *financial distress* with a value of P < |t| = 0.000 or significant at 1% alpha. *H7* accepted.

8. *CEE* has a coefficient of 0.4553 with a probability of 0.0000 and has a positive and significant influence on *financial distress* with a P < |t| = 0.000 or significant at alpha 1%. *H8* accepted.

4.3. Robustness test

4.3.1. Robustness test by comparing developed country and developing country

The results from developed countries are more consistent compared to developing countries. It can be concluded that the results of hypothesis testing in developed countries are more widely accepted than in developing countries with a total sample of 30.569 for developed countries and 8.437 for developing countries. Both research findings have a fit model with F-test results that are below 0.05 significance. This is consistent with the research results of all countries. So, it can be concluded that the research findings are robust.

Table 3. Regression results of Model 1 developed and developing country

Variable	*Model 1*					
	Firm value developed country			*Firm value developing country*		
	Coefficient	*t*	*P > t*	*Coefficient*	*t*	*P > t*
HCE	0.14239	11.47	0,000***	0.108547	5.71	0,000***
SCE	-0.09664	-7.84	0,000***	-0.02268	-1.28	0.202
RCE	0.045093	3.6	0,000***	0.007583	0.41	0.683
CEE	0.169954	1.98	0.048**	2.185625	12	0,000***
SIZE	-0.14853	-8.86	0,000***	0.001092	0.04	0.965
CR	0.01204	1.25	0.213	-0.00515	-0.63	0.529
DER	0.076575	3.73	0,000***	-0.03992	-1.26	0.207
INF	-0.14155	-30.19	0,000***	0.010056	1.74	0.082*
GDP	0.032887	10.99	0,000***	0.022899	6.13	0,000***
FA	-0.00356	-6.18	0,000***	-0.00047	-0.14	0.889
COVIDYears	-0.2413	-15.37	0,000***	0.119369	4.96	0,000***

*Note: * p < 0.10, ** p < 0.05, *** p < 0.01, t-values are in parentheses.*

Table 4. Regression results of Model 2 developed and developing country

Variables	*Model 2*					
	Financial distress developed country			*Financial distress developing country*		
	Coefficient	*t*	*P > t*	*Coefficient*	*t*	*P > t*
HCE	0.227457	15.53	0,000***	0.130899	4.48	0,000***
SCE	-0.10363	-7.12	0,000***	-0.02114	-0.77	0.439
RCE	0.086409	5.84	0,000***	-0.05602	-1.96	0.05**
CEE	0.074696	0.74	0.461	4.176541	14.91	0,000***
SIZE	-0.48905	-24.72	0,000***	0.065142	1.69	0.091*
CR	1.301927	114.18	0,000***	0.62889	49.97	0,000***
DER	0.007301	0.3	0.763	-1.13004	-23.22	0,000***
INF	-0.02238	-4.04	0,000***	0.043531	4.89	0,000***
GDP	0.012565	3.56	0,000***	0.018141	3.16	0.002**
FA	-0.00148	-2.18	0.029**	-0.01116	-2.15	0.032**
COVIDYears	-0.30176	-16.29	0,000***	-0.22266	-6.01	0,000***

*Note: * p < 0.10, ** p < 0.05, *** p < 0.01, t-values are in parentheses.*

4.3.2. Robustness test by removing all control variables

For the second model robustness test, we ran the data without a control variable, and the outcome remained consistent with the use of the control variable. So, it can be concluded that the research findings are robust.

Table 5. Robust test without control variable

Variables	*Model 1 Firm value*			*Model 2 Financial distress*		
	Coefficient	*t*	*P > t*	*Coefficient*	*t*	*P > t*
HCE	0.162675	15.52	0.000***	0.291045	18.67	0.000***
SCE	-0.08796	-8.32	0.000***	-0.16439	-10.46	0.000***
RCE	0.046783	4.29	0.000***	0.151761	9.37	0.000***
CEE	0.234541	3.02	0.003***	0.80116	6.93	0.000***

*Note: * p < 0.10, ** p < 0.05, *** p < 0.01, t-values are in parentheses.*

5. DISCUSSION

5.1. The influence of intellectual capital on the firm value

HCE has a positive and significant influence. Companies need to have valuable knowledge so that the company's ideas and innovations are not easily imitated by other competitors. The higher the valuable knowledge a company has, the higher the company's ability to maintain its competitive advantage. The more productive and efficient the company is in managing employee abilities, knowledge, skills and competencies, the market is more likely to rate the company higher because of the belief in the quality of its workforce. Efficient

work will make a positive contribution to the company's growth and profitability. These results are consistent with Nimtrakoon (2015), Nadeem, Dumay, and Massaro (2018), and Maji and Goswami (2017).

SCE variable has a negative and significant influence on *firm value*. The higher *SCE*, the *PBV* will tend to be lower. When companies have high efficiency in managing intangible assets such as patents, trademarks, intellectual property, and information technology infrastructure, the market does not always value these assets highly in the company's share valuation. The higher *SCE* indicates that the company is efficient, so the company does not need to spend a lot of money to borrow capital. Companies with high *SCE* have lower risks because the company has good financial management so that it can reduce its business risk. These results are consistent with Nadeem, Gan, and Nguyen (2018), and Maji and Goswami (2017).

RCE variable has a positive and significant influence. Companies with good relationships with stakeholders, such as customers, suppliers, employees, investors, and the community, will have a higher market value because the relationships built with stakeholders will increase market confidence in the company's long-term prospects. Knowledge and intellect are assets that enable companies to compete in the market and maintain their competitive advantage. The company's competitive advantage and stronger intellectual capital can positively affect its performance and financial valuation. These results are consistent with Nadeem, Dumay, et al. (2018).

CEE variable has a positive and significant influence. A high CEE indicates that the company can generate good profits from the capital invested. Better financial performance tends to give a positive view to investors and the market, which can increase their interest in owning the company's shares. In addition, a good CEE can give investors confidence that the company faces a lower risk in managing its capital. This can boost demand for the company's shares so that the market values the company higher than its book value. These results are consistent with Al Momani et al. (2021).

5.2. The influence of intellectual capital on financial distress

HCE has a positive and significant influence on *financial distress*. Efficient and productive employees can make a positive contribution to company performance and can help companies face difficult economic situations. Because companies with good human resources will be able to manage their business more efficiently, improve product or service quality, create innovation, and increase the company's competitiveness in the market. However, a company's success is also greatly influenced by good financial management, appropriate business strategy, and other factors involved in a company's financial health. Consistent with the findings of Alexandre et al. (2020).

SCE has a negative and significant influence on *financial distress*. Low *SCE* can contribute to the possibility of *financial distress*, such as a lack of efficiency in systems and procedures. If a company cannot optimize the value of its intellectual property rights, such as patents or trademarks, this can reduce competitive advantage and lead to lost potential revenue opportunities. An organization must adapt quickly to industry-relevant technological changes to avoid being overtaken by competitors and facing declining revenue or lower profit margins. There is evidence that a high level of innovation can increase the risk of financial difficulty. Companies involved in riskier innovation are more likely to experience financial difficulty. This is because risky innovation can incur unexpected costs, weighing on the company's finances. Consistent with the findings of Liu et al. (2021), and Ansyah and Firmansyah (2023).

RCE has a positive and significant influence on *financial distress*. *RCE* can help reduce the risk of *financial distress*. Companies with strong relationships with customers, suppliers, and investors are more likely to be able to access resources when they need them. This can help companies cope with financial difficulties and avoid financial distress. Companies with strong relationships with suppliers are more likely to be able to negotiate lower prices. Companies with strong relationships with their employees are more likely to be able to reduce turnover and improve productivity. This can help companies to improve their financial performance and reduce the risk of financial distress. Companies with strong relationships with their stakeholders are more likely to have access to valuable information. This information can help companies make better business decisions that can improve their financial performance and reduce the risk of financial distress consistent with the findings Wang et al. (2018).

CEE has a positive and significant influence on *financial distress*. Companies with good CEE are also likely to have better risk management capabilities. Companies have identified potential risks associated with the use of capital and taken steps to reduce those risks. Good return on capital can help companies generate enough cash flow to meet future financial obligations, and companies can reduce unnecessary operating costs and increase profit margins. With good risk management, companies can reduce the possibility of financial distress, consistent with the findings of Zhang et al. (2021).

6. CONCLUSION

Intellectual capital research has recently gained more attention due to several research findings suggesting that intellectual capital positively impacts technology, product innovation, and relationships with shareholders, suppliers, and customers. Intellectual capital is an intangible asset comprising knowledge, experience, and human capabilities. Intellectual capital can be used to create new products and services, improve operational efficiency, and improve relationships with customers and suppliers. This study investigates whether intellectual capital and its components affect a company's financial performance and financial distress in the manufacturing sector in Indonesia, Malaysia, Singapore, Thailand, the Philippines, Japan, China, and South Korea. We are motivated to conduct this study because it can add to the existing literature on this topic. We reveal several findings by using various variables. These findings can help

the current literature. Unlike previous studies, this study first utilizes financial distress and proxy relational capital efficiency and innovation capital efficiency in the EVAIC+ model. Size, current ratio, debt to equity, founding years, inflation, GDP, and COVID years are control variables to investigate the relationship between intellectual capital and corporate value.

Our results show, first, that the implementation of intellectual capital disclosure is generally better in developed countries than in developing countries. This is due to several factors: facilities and resources, awareness and regulations. In developed countries, companies generally disclose information about all intellectual capital components, such as human capital, structural capital and relational capital. In developing countries, companies generally only disclose information regarding human capital and structural capital. Second, intellectual capital is essential in increasing business value. Third, this study is a pioneer in producing more robust results. It shows that capable employees will improve innovation, increase customer satisfaction, increase sales due to product and service innovation, and avoid corporate financial distress. Therefore, companies must make more efforts to develop intellectual capital to grow more businesses. Finally, this study has produced more robust results using a panel data model and robustness test.

This study has limitations that can be used as a reference for future studies to achieve better results. First, the company that is the sample in this study is an Asian country, it can be expanded to another country because every country has different characteristics, social culture, and investor behaviour. Second, some data are unavailable in S&P Capital IQ, data accessibility and quality can have an impact on the reliability and validity of its conclusions. Third, future research can use another method to measure intellectual capital such as a balanced scorecard.

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